UNESCO SOURCES

N 38 - JUNE 1992

GEOLOGY

GETTING TO KNOW THE UPPER CRUST

1492 : THE NEMESIS OF AFRICA

Readers, we have reserved this page for your comments, suggestions and criticisms. Consider it yours !

TAKING AN HONEST LOOK?

Mohamed Larsi
History teacher
Oran, Algeria

In the editorial of your May issue, you made mention of the fact that some 50,000 people would meet in Rio de Janeiro for the so-called "Earth Summit". Their encounter will provide an opportunity to take a good, hard look at ourselves. But will we do so?

A similar milestone was reached mid-way through this same century when six million people were slaughtered by the Nazis. Nobody at the time, it would seem, knew what was happening...

Today, between 60 and 115 million Africans - to take one case only - are threatened with famine. All the world, it would seem, knows about it...

Question: how much time will it take for the 50,000 eminent participants of UNCED - who, in fact, are meeting to discuss life on this planet - to denounce the barbed wire barriers and watch-towers of the "new world order"?

Here's hoping for a response in your next issue.

In its May issue (What on Earth's the Matter?) UNESCO Sources clearly pointed to the crisis of poverty afflicting the Third World, and of which the famine threatening Africa is one of the most horrifying aspects. On many other occasions the magazine has also evoked, in its own manner, the correlation between this crisis and the mechanisms dominating international relations. **Ed.**

OBSTACLES TO THE CIRCULATION OF INFORMATION

Malapo R. Molefe
Journalist
Dar es Salaam, Tanzania

Quite a deal can be achieved in social development thanks to the free flow of information. But the mechanism of this flow of information is conditional to a conducive climate. All obstacles impeding this process (if possible) have to be duly identified and isolated.

In your March issue (No 35), you appropriately addressed the fate of the Pan African News Agency (PANA) and proposed a few important recommendations.

According to the 1976 OAU Cultural Charter for Africa, African governments had to ensure the total decolonization of the mass media. The national news agencies which have conglomerated to form PANA have had to depend on foreign agencies such as Reuters for news on events emanating in and about Africa. It ought to be the other way round. That is, national news agencies should depend on PANA.

During the Non Aligned Movement summit held in Colombo in 1976, the summit emphasised its concern at the growing gap between the communications capabilities of the Non Aligned countries and those of the developed countries, which is a legacy of their colonial past, and it stressed that *"a new world order of information is just as important as a new international economic order"*.

PANA's limitations in dissemination of information seem mainly to be of an administrative nature rather than a financial one. For instance if PANA receives a news story from one of its member news agencies, it sends that story out raw - i.e. unedited. This ultimately spoils the quality of PANA's work. Had this not been the case, most or probably many foreign news agencies could be subscribing to PANA.

FILLING A NEED

Amandio Pereira
Student
Lisbon, Portugal

I learnt of your interesting publication from a fellow student. The information therein is precise, easily accessible and varied.

Personally, I am most interested in questions to do with protection of the atmosphere and through UNESCO Sources I have been able to increase my knowledge on this subject.

I would thus like to thank the editorial team for its excellent work.

AN EDUCATIONAL READ

Luis Antonio Pereira Lourenço
President du Directoire de l'Ecole Sainte-Marie
Sintra, Portugal

Please keep on sending your publication which is so informative and educational.

We are certain that in our school we can get the maximum educational impact in promoting the various topics you cover.

UNESCO SOURCES IN CATALAN

From this issue onwards, UNESCO Sources will also appear in Catalan. Those readers who would like to receive this language version should write to the UNESCO Centre of Catalonia, Mallorca 285, 08037 Barcelona, Spain.

REFORMS (THE SEQUEL...)

The last General Conference put into motion an institutional reform of the Executive Board deciding that its members would be appointed exclusively as representatives of their country rather than in a personal capacity. The Board's Spring session (May 18-27, 1992) in turn launched a series of initiatives to give this reform its full measure.

As a support to this new kind of Board, and in a bid to strengthen UNESCO's intellectual mission, an ad hoc Forum of Reflection is to be established. Eighteen of the Forum's 21 "eminent personalities" *will be nominated by the Board and the others by the Director-General.*

"Particularly well-fitted to open up fresh perspectives for reflection and global intellectual cooperation", *these "sages" will serve in their personal capacity and draw up their own agenda for* "identifying and defining a number of vital issues representing new challenges". *The Board will* "consider the action to be taken (on the results of the Forum's work), selecting, if necessary, from the issues identified ... those that could form the subject of more far-reaching study by experts designated for the purpose". *The next General Conference will decide whether the Forum becomes a permanent fixture.*

On the other hand, the Board's expert advisory group on financial and administrative matters has already started work, even though details have yet to be finalized as to how it should function.

Among the questions to be tackled in this field is UNESCO's cash situation. The Third World's "lost decade" and the upheavals in Eastern Europe have aggravated the arrears and delays in payment of the obligatory contribution of Member States. Should the worst scenarios be held up as inevitable and thus run the risk, through action based on this thinking, of becoming reality? How should responsibilities be shared between the Member States, the General Conference, the Executive Board and the Director-General?

In short, the Board has begun to prepare itself for the choices that it may have to make at its Autumn session in the latter half of this year when it has a better idea of the state of UNESCO's coffers. These choices, along with the changing world situation and the work of the Forum, will undoubtedly lead to others of a more fundamental nature on the Organization's future role. There is still a long way to go.

René LEFORT

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READEX

BOOKS

THE CHRISTIANIZATION OF ANCIENT RUSSIA: A Millennium 988-1988

Explores the events surrounding the baptism of Rus', the spread of the Christian message, the classical and Byzantine origins of

Russian art and religious music, and the relations between Christianity and Russian society. The Russian Orthodox Church's contribution to the ecumenical movement in recent years is also considered. A compendium of papers prepared for a symposium organized by UNESCO in 1988 to commemorate the Millennium of the conversion of ancient Russia - or Rus' - to the Christian faith, it brings to light much valuable research in areas that are once more the focus of world attention.

● ***The Christianization of Ancient Russia: A Millennium 988-1988**, Yves Hamant Ed. UNESCO 1992, 337 pp.,150FF.*

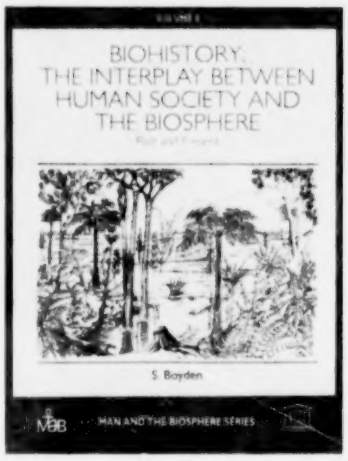
ENVIRONMENTALLY SUSTAINABLE ECONOMIC DEVELOPMENT:BUILDING ON BRUNDTLAND

Building on the Brundtland Commission's 1987 report, "Our Common Future", this work by eight distinguished authors including two Nobel laureate economists (Haavelmo and Hansen), pleads for a rapid transition to sustainability. It sets the stage for this month's "Earth Summit", acknowledging the need for more development in the South, indeed for more burdensharing or reparation for the North's historic overuse of global environmental functions - both as source for natural resources and sink for wastes. Finally, it equates a sustainable world economy with a higher social order - one as concerned with future generations as with our own, and more focused on the health of the planet and the poor than on material acquisitions and military might.

● ***Environmentally Sustainable Economic Development: Building on Brundtland**, Edited by R. Goodland. UNESCO 1991, 2nd impression 1992, 100 PP, 50FF.*

BIOHISTORY: THE INTERPLAY BETWEEN HUMAN SOCIETY AND THE BIOSPHERE

After introducing the biohistorical approach, this richly illustrated book begins with a discussion of the evolution, interdependencies, diversity and sensitivities of living organisms and systems. It is, however, mainly devoted to the impacts of culture-induced human activities on natural



systems - on the health and well-being of humans themselves and on the biosphere. The author, who believes that the biohistorical perspective can help society overcome environmental and social problems, nonetheless warns that the biosphere will not indefinitely tolerate present patterns of resource and energy use by human society.

● ***Biohistory: The Interplay Between Human Society and The Biosphere**, by S. Boyden, MAB Book Series, Vol. 8, UNESCO/Parthenon Publishing 1992, 265 pp., 380 FF*

PERIODICALS

THE UNESCO COURIER

In Praise of Tolerance

The June *Courier* comes out in "praise of tolerance," that "awkward virtue" as British philosopher Bernard Williams calls it. *"No society can be safe from the temptation to practise exclusion and intolerance unless it shows constant determination and vigilance,"* insists Ehsan Naraghi, Iranian sociologist and historian, describing the challenge as one of accepting *"that each of the five and a half billion human beings on the planet can have his or her own ideas and preferences,"* while admitting *"that those of others are just as worthy of respect"*. A new section, **Greenwatch**, inaugurated in this issue, is devoted to the environment. Also featured is an interview with Brazilian architect Oscar Niemeyer.

IMPACT of Science on Society

Trends in Science Education.

The future of science education, its objectives and purposes and the need to adapt it to the evolution of science and technology and the requirements of socio-economic development, is the subject of wide debate. The particular needs of developing countries, distance education, the continuing education of engineers and the role of agricultural universities in development are just some of the topics dealt with in this issue (No. 164). Other articles are devoted to the use of remotely sensed images in marine science education, mathematics in everyday life, and modelling in the teaching and popularization of science.

CATALOGUE

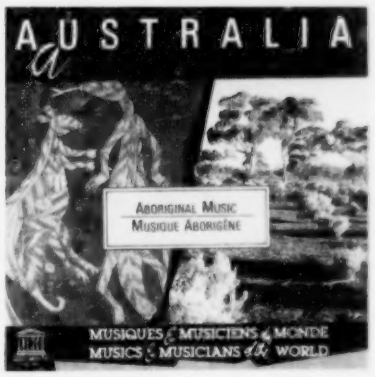
PUBLICATIONS CATALOGUE 1992

A 130-page catalogue listing all titles available in English - and in multilingual versions - published by UNESCO Press, by institutions which belong to the Organization, or co-published with commercial houses, and including all the necessary information for purchase or order is now available from UNESCO Press, Promotion & Rights Division.

RECORDS

AUSTRALIA
Aboriginal Music

Australian aboriginal music is essentially vocal and mainly the prerogative of men. Regional differences, however, are considerable both in the quality and range of voices, in styles of group singing, and in the type of accompanying instruments, most of which are of wood and simply constructed. All of these aspects are reflected on this disc, recorded notably during initiation rites and death ceremonies. While reinforcing social relationships and proclaiming the identity of



particular groups and their territories, all forms of aboriginal music are related in some degree to the myths, belief systems and ceremonial complexes of particular regional groups.

● ***AUSTRALIA. Aboriginal Music.** Musics & Musicians of the World series, UNESCO/ Auvidis, 1992, Cassette 52FF, Compact 109FF.*

Publications and periodicals are on sale at the Unesco Bookshop, or by order from Unesco Press, 7 place de Fontenoy, 75700 Paris, and in Member States through national distributors. Catalogue on request.

REEF RESCUERS WIN TOP MARINE AWARD

Coral Cay Conservation, a British non-profit organization working to safeguard the coral reef of Belize received the first Marine Environment Award at UNESCO Headquarters on May 12.

The biennial award, worth 50,000 French Francs, was created by the World Underwater Federation (CMAS) with the patronage of UNESCO, its Intergovernmental Oceanographic Commission, the Worldwide Fund for Nature, the World Conservation Union, British Divers Marine Rescue, the US Environmental Protection Agency and the French Ministry of the Environment.

Peter Raines, 31, and Jonathan Ridley, 28, both directors of the CCC were on hand to receive the cheque. The money, they said would be help fund the 24 scholarships awarded annually by CCC to teach Belizeans to dive and carry out survey work on the reef, which is second only in size to the Great Barrier Reef of Australia.

"We hope to train enough Belizeans to continue our work, so that we will make ourselves unnecessary by 1995," Raines said.

TOURISM

The CCC project began in 1986 with a series of university expeditions to the reef. In 1989, the Belize Government asked CCC to continue the survey work and to help establish a management plan for the reef, which is under threat from increasing tourism and the ensuing development. Belize has only 200,000 inhabitants, but last year alone some 250,000 tourists visited the country. Hotels, airports and roads are being built, while *"mangrove forests are being taken away for the tourists to make nice sandy beaches, which disappear after the first storm"* Ridley explained.

One of the unique features of the CCC operation is that it much of the survey work is carried out by teams of paying volunteer divers. Last year some 300 people from all walks of life participated in the scheme which includes an intensive training course for the survey work and a rigorous programme of at least two dives a day, as well as cooking, cleaning and general maintenance!

"These people work very hard; they don't just go there to lie on a beach or look at something," Ridley stressed.

It was this outstanding cooperation between scientists and amateurs, as well as the professionalism of the conservation work and the successful fundraising efforts that won the jury over for this first award.

Sue WILLIAMS

INTERNATIONAL PRESS FREEDOM DAY

When UNESCO organized a meeting in Windhoek in May 1991 on the emergence of an independent press in Africa, Gitobu Imanyara was behind bars. The seminar participants, who launched a solemn appeal in favour of a free press in Africa, also used the occasion to call for the release of the renowned Kenyan journalist.

Thus on April 30, at UNESCO headquarters, Imanyara, 38, was guest of honour at the commemoration of the first International Press Freedom Day (actually on May 3, but this fell on a Sunday). *"The current democratization process in the world owes its force and strength to the press,"* he stressed. *"Doubtless still, the press remains the most dreaded institution to autocratic rulers the world over. For this reason, it is often the first victim of their anger."*

Director of the French-based Reporters Sans Frontières, Robert Ménard, said that his organization knows of at least 107 journalists in jail throughout the world and noted that 72 died last year while on duty - the highest number in 15 years.

The Director-General of the International Federation of Newspaper Publishers (FIEJ), Timothy Balding, reproached the industrialized nations for having *"abandoned"* the fledging independent media struggling to find its feet in Eastern Europe and other parts of the developing world. Mia Doornaert, President if the International Federation of Journalists, heavily criticized the notion that fundamental rights like freedom of expression and freedom of the press are Western values that cannot be imposed on other regions of the world. *"This ridiculous argument"* she said *"is usually used by dictators and authoritarian regimes who want to control the people's way of thinking to their own advantage."*

For his part, UNESCO's Director-General, Federico Mayor, recalled that the Organization's new communications programme concentrated on the development of a free, independent and pluralistic media in both the public and private sectors. He also appealed to Member States to *"facilitate and guarantee journalists the freedom to report"* and thus allow *"the fullest possible access to information...*

GITOBU IMANYARA
(Photo UNESCO/Inez Forbes).

"Lastly", he concluded, *"I want to reaffirm UNESCO's readiness to act in concert with all media associations whenever press freedom is endangered or suppressed. I am confident that, by dint of conviction and perseverance, great strides can be made in furthering the free flow of ideas by word and image. And that is one of UNESCO's major constitutional functions."*

N. M.

● **UNESCO Goodwill Ambassador, Peter Ustinov,** and former Director of the Organization's Office of Public Information, Leon Davico, were awarded the title of Doctor Honoris Causa by the University of Durham (U.K on May 7. During the ceremony, the various United Nations agencies were praised for their efforts *"against ... greed, materialism, violence and war"*.

● *"We are very pleased that UNESCO is helping to show the way"* towards **reinforcing press freedom.** Thus declared the U.S representative to the last plenary session of the Conference on Security and Cooperation in Europe (CSCE), which was held in Helsinki on May 13. The United Kingdom, Germany and Russia all supported this view.

GETTING TO KNOW THE UPPER CRUST

We trample over it, dig into it, add various and often poisonous chemicals to it and, in general, take it for granted. However, like the air we breath and the water we drink, the Earth's crust, or the Lithosphere, is a vital resource that needs careful management. All the more so, according to eminent geologist Umberto Cordani (p.9), as human activity has now become a significant geological force. This month's FOCUS is thus devoted to the International Geological Correlation Programme, a joint endeavour between UNESCO and the International Union of Geological Sciences (see below). Four of the Programme's 59 current projects, chosen to illustrate geology's contribution to research into the planet's most acute environmental problems, provide an overview of the type of work it undertakes and supports. The dossier closes with a run-down of the other aspects of UNESCO's programme and activities in the Earth Sciences such as the mitigation of natural hazards, geological mapping and remote sensing.

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What most people seem to worry about these days is pollution of air and water. In view of food supply, soil is also a matter of deep concern. However, the underlying rocks are often disregarded.

Earth sciences are highlighted as a rule only when natural disasters such as landslides earthquakes and volcanic eruptions occur, devastating human settlements and cultivated areas, killing tens of thousands of people.

Nevertheless, modern civilisation is based essentially on raw materials mined from the solid crust of our planet. Metals are extracted from ore minerals. Most of the energy we consume comes from fossil fuels, such as coal, petrol and natural gas. Even plastics are produced from these. Agriculture uses huge quantities of mineral fertilizers, containing a number of trace elements indispensable for all living organisms. Most of the construction materials are supplied by the solid earth: building stones, gravel, clay for bricks and tiles, limestone for cement, etc. Our jewels, in fact all that glitters - such as gold, emeralds and diamonds - are composed of minerals.

Even the successive stages of human history have geological connotations: "Stone Age", "Bronze Age", Iron Age", up to the present Age of Nuclear Energy, which is based on the minerals of radioactive elements such as uranium.

Geologists consider the planet Earth as a complex system which has been developing for 4,5 billion years or so. It consists of a number of concentric "geospheres": the core composed of heavy metals, the mantle consisting roughly of silicate melt, the lithosphere or crust comprising a bewildering variety of rocks and minerals, the hydrosphere (seas and continental waters), the atmosphere (the air), and the outer magnetosphere.

All these latter have been interacting. And ever since the appearance of life on Earth, the living organisms (the "biosphere") have been deeply involved in this uninterrupted exchange of matter and energy. We human beings are no exception to this rule - and play a very particular role. Our impact on the other components of the system is rapidly increasing with the swelling world population and spreading industrial development.

However, mineral resources are not renewable, at least not on the human time scale. We need to know how, where and when they have been formed, what are the reserves we can calculate with, and how we can use them reasonably, without further polluting and degrading our own environment.

Are we heading towards a new Ice Age? Or, on the contrary, will the famous "greenhouse effect" bring about a warming up of the climate? Where and why are deserts advancing? Where and at what rate is the sea level rising? Which are the earthquake-prone zones?

The responses to these and many similar questions are provided by the study of past and present-day geological processes.

THE PIECES OF THE BIG PUZZLE

Evidence on rocks, minerals and fossils (remnants of plants and animals preserved in the sediments and rocks) has been collected for centuries in various regions of the world and studied in much detail.

Modern technology has rendered it possible to explore deep into the Earth's crust; down to 10-15 km by drilling, and even deeper using geophysical measurements. With this technology, samples can be taken from the ocean floor or the Moon and the soil of Mars can be studied. Rocks and minerals can be analysed in great detail, and the structures of the crust examined by means of aerial photographs and satellite imagery ("remote sensing").

Computer techniques are available to handle, process and evaluate the alarmingly increasing flood of data, which must be fitted together to reach scientifically sound

and practically useful conclusions. This procedure is called "geological correlation".

In the same way, earth scientists must also correlate. It is no longer admissible for geologists to confine themselves to the study of a restricted region or a highly specialized topic. To be more precise, such regional and specific studies are useful, needed and even undispensable, but they have to be considered as integral parts of a worldwide research.

Interregional, international and interdisciplinary cooperation simply cannot be avoided.

In 1972, the International Union of Geological Sciences (IUGS, a non-governmental organization, a member of the International Council of Scientific Unions, ICSU) and UNESCO agreed to launch a joint venture called the "International Geological Correlation Programme". With its managing Secretariat located in the Division of Earth Sciences of UNESCO's Science Sector, it has become one of UNESCO's core scientific programmes.

25,000 PUBLICATIONS IN 20 YEARS

With 168 scientific research projects under its belt (112 already terminated and 56 ongoing in 1992), National Committees established in 93 countries on five continents, contacts with 22 other nations, thousands of earth scientists actively contributing and about 25 thousand scientific publications produced in twenty years, the IGCP can rightfully claim to have had a real impact on the earth sciences.

These achievements will be presented to the 29th International Geological Congress in Kyoto (Japan), in August 1992, where a special symposium will be devoted to the past, present and future of the Programme. Fifteen of its projects will hold scientific session in the framework of the Congress.

The last congress, held in Washington D.C. (USA) in 1989 saw the biggest gathering of geologists ever held, with almost 6,000 participants.

IGCP projects may be regional, interregional, or global in scope. Some of them are of a methodological character, not bound to any specific region. But all of them are truly international, having active working groups in a number of countries (in some cases up to 60). Quite a few nations focus their efforts on a few selected projects only, but some participate in more than 40.

East-West, North-South and South-South cooperation, free exchange of data and experience, transfer of knowledge from industrialized to developing countries are nothing new for the IGCP. They have constituted its everyday practice since the very beginning, sticking to the slogan *"Geology is insensitive to national boundaries"*.

Despite its broad scope and high contributions, the IGCP has a modest budget of slightly less than $500,000 for the 1992-93 biennium. The partner non-governmental organization, the IUGS, contributes about $140,000 a year. This is, as a matter of fact, a voluntary contribution granted by the National Academy of Sciences of the USA and the Royal Society of the United Kingdom - two countries which are, for the time being, not member states of UNESCO, but nonetheless are very active in some of its programmes, among them the IGCP.

This su; translates into an average of $6,100 per project for 1992. This is, of course, a mere drop in the bucket, but nonetheless serves as "seed money" that mobilises an extra $30m a year from extrabudgetary sources.

RESULTS

IGCP projects have - among other things - compiled existing information on, and generated new information about, the world's deposits of phosphorites, coal, tin/tungsten, bauxites, and the sulphidric ores of copper, lead, zinc and nickel, as well as iron ores. For example, one IGCP project has produced a three-volume summary of all available evidence on the phosphate deposits of the Earth, which are of crucial importance in producing agricultural fertilizers.

They have also: contributed to the better understanding of the controversial effect of terrestrial and extra-terrestrial events (e.g. meteorite impacts) on the evolution of plants and animals; produced integrated data sets and other new information concerning the causes and the present status of sea level changes; and provided new information about the causes of desertification.

Estimates about the time scale of the Earth's history have been refined by coordinating the collection of rock samples from key geological formations around the world and using up-to-date laboratory methods to date the samples. New data has been computerized on igneous and sedimentary rocks, and the data bases made accessible to scientists worldwide.

Despite this remarkable progress, our knowledge and understanding of the Earth is in need of steady improvement. Not only for the sake of "pure" science, but also for a better and sustainable management of the resources of our planet, in view of the ongoing processes of global change, including the geological ones.

We owe it to future generations.

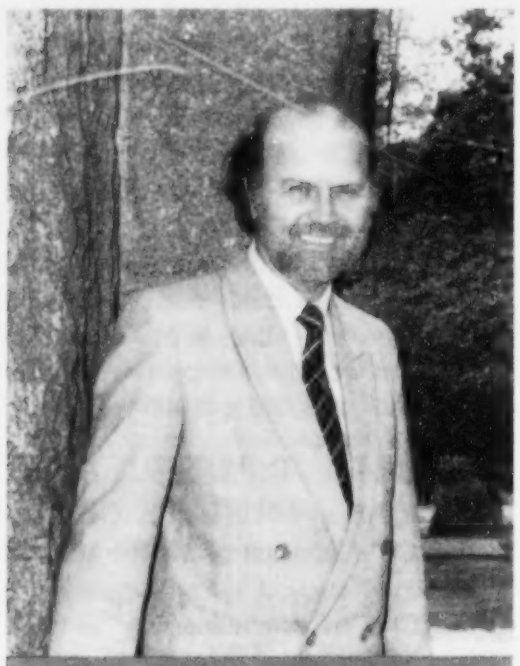
Dr. Endre DUDICH
IGCP Secretary

Portrait

ROCKS IN HIS HEAD

A champion of international scientific cooperation, IUGS President Umberto Cordani foresees a major role for geologists in promoting a global, earth-as-a-system, outlook

Prof. Umberto G. Cordani, President of the International Union of Geological Sciences (IUGS), co-sponsor with UNESCO of IGCP, can tell a Precambrian from a Paleozoic rock with his eyes closed (provided of course his spectrometer is open), and talk for hours on volcanic and plutonic sequences of batholitic dimensions, migration of the magmatic arc during the cenozoic, even on radiometric ages and paleomagnetic analysis.



IUGS PRESIDENT CORDANI AT UNESCO
(Photo UNESCO/Inez Forbes)

Yet he can also speak excellent English and French (Italian and Spanish...), as he demonstrated recently in Paris, guiding his audience from the Precambrian, up through the Quaternary with, however, a hint of preference for the Cretaceous.

"You may be interested to know," he said, *"that in parts of the Cretaceous* (120 million years ago) *the average temperature of the Earth was some 10 degrees higher than today. There was no ice, and palm trees grew in the polar regions. This shows that our planet can reach extreme conditions even without a greenhouse effect produced by human activity."*

Nonetheless, Cordani recognizes the environmental crisis facing the planet today as particularly acute. *"Soil degradation, desertification, deforestation, water pollution: most of these problems are related to the growing human population, which is starting to reach saturation,"* he said. *"Human activities now involve an annual flux of earth materials that is equal to that of plate tectonics. We have become a geological force!"*

Cordani, who is professor and former director of the Institute of Geosciences at the University of Sao Paulo (USP) in Brazil, places great stock in the Earth Summit Conference which he will attend in Rio de Janeiro this month. *"Not so much because I expect any miracles,"* he explained *"but because I feel it can be the starting point for real dialogue, and hopefully action, on genuine development."*

Born in Milano, Italy in 1938, Umberto Cordani went to Brazil, where his father worked as an engineer, at age 11. He studied in Sao Paulo and *"went into geology because at the time it was a pioneering field."* In fact there were so few geologists in Brazil that he was asked to join the staff at USP. Sent to study geochronology - the dating of rocks and minerals - at the University of California in Berkeley, he then set up a K-Ar (potassium-argon) laboratory at USP, the first in South America.

PLATE TECTONICS REVOLUTION

Both his training and the lab put him in good position, with colleagues from the Massachusetts Institute of Technology (MIT), to carry out an extensive geochronological survey of Brazil and West Africa to test the theory of continental drift. Their decisive evidence in favour of the separation of Brazil and Africa played a major role in discussions which led in the late 1960s to the scientific revolution known as the Plate Tectonics Theory (see pp. 12-13).

Cordani didn't only date rocks. He also dated, then married Lisbeth, a Brazilian statistician, also at USP, with whom he has two children, Marina, 25, and Renato, 22, a budding geo-physicist.

Dr. Cordani's work, in the 1970s, on IGCP Project 120 *"Magmatic Evolution of the Andes,"* was one of the most successful ever fostered by the Programme. *"Before that,"* he said, *"there were very few age measurements of the chain and no coordinated research among geologists in the Andean countries."*

As part of the project, hundreds of scientists participated in seven symposia, 10 seminars and 12 courses to train geoscientists in geochronology and isotope geology. Over 340 articles were published and new geochronological laboratories installed and developed in Chile and Argentina.

"The project marked a major jump in scientific knowledge in the region," said Cordani, *"not only because of its scientific results, but even more so because it laid the bases for cooperation, and led to a number of other regional IGCP projects, notably dealing with tectonics, geochemistry and metallogenesis."*

"As a representative of the Third World, I must stress the importance of the role geologists can play in advancing genuine north-south cooperation especially in the field of mining exploration, trying to reverse the very adverse situation of the Third World. The industrialized countries, with about one-quarter of world population, use more than 80% of its mineral wealth. As a result, the mineral potential of the Third World really only benefits the industrialized nations and a small minority in developing countries."

"By the way," he asked, *"What does it mean exactly 'rocks in the head'?". "Oh, I see. The crazy geologist, eh? Yes. We do have that reputation, doubtless through our own fault because we tend to use difficult language and isolate ourselves. The result is that rocks and minerals are no longer part of the common culture and we geologists are practically invisible in society."*

And yet sedimentation, erosion, natural hazards are all part of life. *"We must re-introduce earth sciences into educational programmes."*

Cordani insists that the geosciences have a fundamental role to play, and not only with regard to mineral resources, natural hazards, studying the past to help assess present and future global change, etc. *"The complexity of contemporary problems is such,"* he said, *"that we must cooperate with the other sciences to reinforce sustainable development through a global, earth-as-a system, perspective."*

Hope for humanity? *"Of course,"* he concluded, *"I am an optimist. Follow my example - and take Rio as a starting point."*

Betty WERTHER

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THE EVOLUTION OF COASTLINES ...

Coastal evolution offers "an archive of past conditions"

In many parts of the world, in many languages, the tides of the ocean represent change; the solid earth, by contrast, is associated with hard rock and so seems stable. But at coasts made of "soft"rock - such as sand, pebbles, clay, and peat - change is a feature of the landscape. The earth's coastlines have been evolving from the time of the first land masses down to the present day.

The "recent" history of these changes and the forces that cause them are the subject of UNESCO's IGCP Project 274, which addresses the last 120,000 years or so of the Quaternary period, with particular emphasis on the last 10,000 (the warm epoch known as the Holocene).

The Late Quaternary comprises just the blink of an eye in a 4.5-billion-year history; but in that one blink, sea level fell and rose some 100 metres as the globe went through the latest cycle of warm to cold and back to warm conditions. Along with these shifts came changes in the direction, force, and temperature of the winds and currents, the range of the tides, and the availability of "building stones" for the various coastal environments: gravel, sand, mud, peat, and coral limestone. The job of describing, dating and making sense of the arrangement and age of these building materials (or what is left of them) in different parts of the world calls for a broad network of investigators, and Project 274 lists over 600 participating researchers in 70 countries.

2000 YEARS OF CHANGES IN SEA-LEVEL, CLIMATE AND SEDIMENTARY DEPOSITS HAVE SHAPED THIS COASTLINE IN THE UNITED STATES (Photo Dann Blackwood/U.S. Geological Survey)

But what happens when a number of scientists converge on a coast for study? What exactly do they do? Project leader Orson van de Plassche, of the Free University of Amsterdam, explains that the methods of gathering data are more or less the same everywhere, but ease of application varies with the setting. At sites where the land has been rising out of the water (for instance, Scotland or Scandinavia), the remains of older coastal deposits are fairly accessible for inspection and sampling. Even in areas of uplift, however, one may have to drill or make artificial exposures of the sediments for study. And where the land is sinking and older sediments are submerged under present sea level (as in the Netherlands, for example, or the eastern coast of the United States), researchers may drill 10 to 20 metres deep on land, or 90 to 130 metres deep offshore, in order to survey the last 5,000 to 20,000 years.

The IGCP project does not fund the research itself, but instead helps to pay for annual communication among far-flung researchers. Eventually, the efforts of the participants should result in global and regional maps of patterns of coastal evolution from the large-scale (sea-level change and climate) down to the small-scale (tides, waves, and local availability of sediments). Project 274 makes it possible for participants to compare data from many sites, to pass along questions or preliminary findings to those who can best follow them up, and to gather at one or more international meetings each year. Towards the end of 1992 New Zealand will host one such gathering.

Another crucial form of communication in this field also receives support from the IGCP project. This is the costly process of radiocarbon-dating the sediments to determine their age. As van de Plassche says, *"if you don't know the age of what you have - a dune or an old beach, a former marsh deposit, a coral reef, or a mangrove peat - then you can't put it into a larger time frame"* in order to compare it with what happened elsewhere at the same time. With encouragement from the IGCP, 24 laboratories have now formed a radiocarbon-dating pool, offering to analyze a number of sediment samples at little or no cost, for colleagues in developing nations.

This summer, van de Plassche is experimenting with a different locale, as well as a different time frame. In Connecticut and Cape Cod, in the United States, he and a team of Ph.D. students from the Netherlands are working with American colleagues to take a close look at coastal salt marshes. These specialized, somewhat fragile ecosystems hold much information about short-term changes in sea level and their consequences for coastal evolution during the last 3,000 to 4,000 years.

FROM PAST TO PRESENT

In 1990, Project 274 established links with UNESCO's Division of Marine Sciences, with benefits to both sides. The aims of the two efforts are complementary, as van de Plassche explains: *"Marine sciences is concentrating on the present and we focus on the past. But the results of their studies are important for us. And vice versa, of course - our studies will be useful to them. You know, an important feature of geology is scale. If you study the present, say the last 40 or 80 years, you will see small-scale fluctuations in climate, sea level, coastal activity, and so on. But unless you know some thing more of the past - several hundred or a few thousand years - you can't tell how these fit onto a larger trend.*

"I look at coastal records as an archive of past conditions," van de Plassche goes on. This archive holds value for many fields: *"Coastal evolution involves changes in sea level; it also involves climate, crustal movements, wind force, and currents. So the oceanographer, the climatologist, the geophysicist - all these have an interest in what we do."*

Sandra J. ACKERMAN
New Haven, U.S.A.

... AND THE DESERT

Could the much discussed greenhouse effect "green" the world's tropical deserts? There's a good chance, say the geologists

What if the dreaded and much talked about "greenhouse effect" caused by pollution turned out to hold some benefit for mankind after all? For the last five years a project of the International Programme for Geological Correlation (IGCP), involving scientists from about 40 countries, has been studying this question: could global warming contribute to shrinking tropical deserts and make life blossom where it now struggles to exist?

It seems at first absurd that rising world temperatures could lead to a renewal of the flora and fauna in an environment as arid as the Sahara desert. Yet this theory found its way into the minds of scientists when they started looking at the earth's past. From 1987 to 1992 the IGCP's "Project Number 252" has examined the "archives" left behind in geological strata. Scientists taking part in this project have analyzed evidence of past environments in the vast desert area from the Atlantic to China. They have held seminars, studied the soil in Australia, Arizona, India, Morocco, and Mexico, and published their findings in numerous scientific journals.

A SEMI-AQUATIC SAHARA

The rock drawings left behind by those who lived in the present Sahara region more than 5,000 years ago show antelopes, hippopotamuses, rhinoceroses, lions, and elephants amid luxuriant vegetation. *"The earth has always experienced alternating periods of warming and cooling according to known cycles, due to differences in sun exposure,"* says French geologist Nicole Petit-Maire. In global cooling times (the ice ages), tropical deserts in studied zones--the Sahara in particular--tend to expand toward the equator, whereas they retreat to the north in global warming times.

"At the peak of the last global-warming period, about 9,000 to 6,000 years ago, the boundary between the Sahara and its 'shore,' the Sahel, was about 500 kilometers more to the north than today," adds Petit-Maire, who works in the geological laboratory of the French National Center for Scientific Research in Marseille and also leads the IGCP project. *"There was then on the whole of the Sahara region a semi-aquatic environment consisting of fresh-water lakes or swamps and Sahel steppes where the big mammals we now find way south lived. Conversely, during the preceding ice age - between about 21,000 to 10,000 years ago - the desert stretched 300 to 400 kilometers more to the south than it is today."*

The explanation is that varying temperatures on the ocean's surface and shifting trade winds alter the intensity and range of the monsoon rains that delimit the borders between desert and Sahel. This phenomenon, however, is not unique to the greatest desert on Earth: *"Similar changes have been registered in the Arabian peninsula, the Persian Gulf, the north of India, and western China; all regions where climate is linked to the presence or absence of monsoons,"* says Petit-Maire.

Researchers are thus probing the Earth's strata not only to get a better grasp of their long geological history but also to try to anticipate the future.

Such a "reading" can be used in estimating the likely consequences of the current global warming period (artificial this time around) by comparing it to past natural ones, even though mechanisms differ somewhat. The mathematical models that aim at forecasting the climate according to the laws of physics are quite shaky, especially when it comes to continental regions: they cannot take into account all the infinitely complex biochemical factors involved (some occasionally end up with data on the past that do not agree with observation).

Is it therefore possible that, if temperatures on the earth's surface go on rising (which is not yet certain), we will see a greening of the Sahara? It has indeed been raining more on the border regions of the desert in the last few years, but are we witnessing a major change in climate or just a temporary natural occurrence? Only time will tell. Besides, another variable is at work in the Sahel: the human factor and its corollary, desertification.

"Man is burning down forests, herds destroy the vegetation and multiply at a worrisome pace. This is not happening in the Sahel only: desertification is taking place in the Amazon as well, and in the regions south of the Sahel." Thus, just as mankind has been helping along the natural extension of the desert to the south in the last thousand years, today we are probably thwarting the useful effects of a new Sahara regression and northern Sahel expansion.

In any case we should not forget that when seven million square kilometers of desert were brought back to life during the last era of global warming, the whole process took tens of thousands of years. The concept of time is not grasped the same way by geologists and laymen. For the latter, 150,000 years is the basic unit for measuring the recent past.

Nicolas MICHAUX

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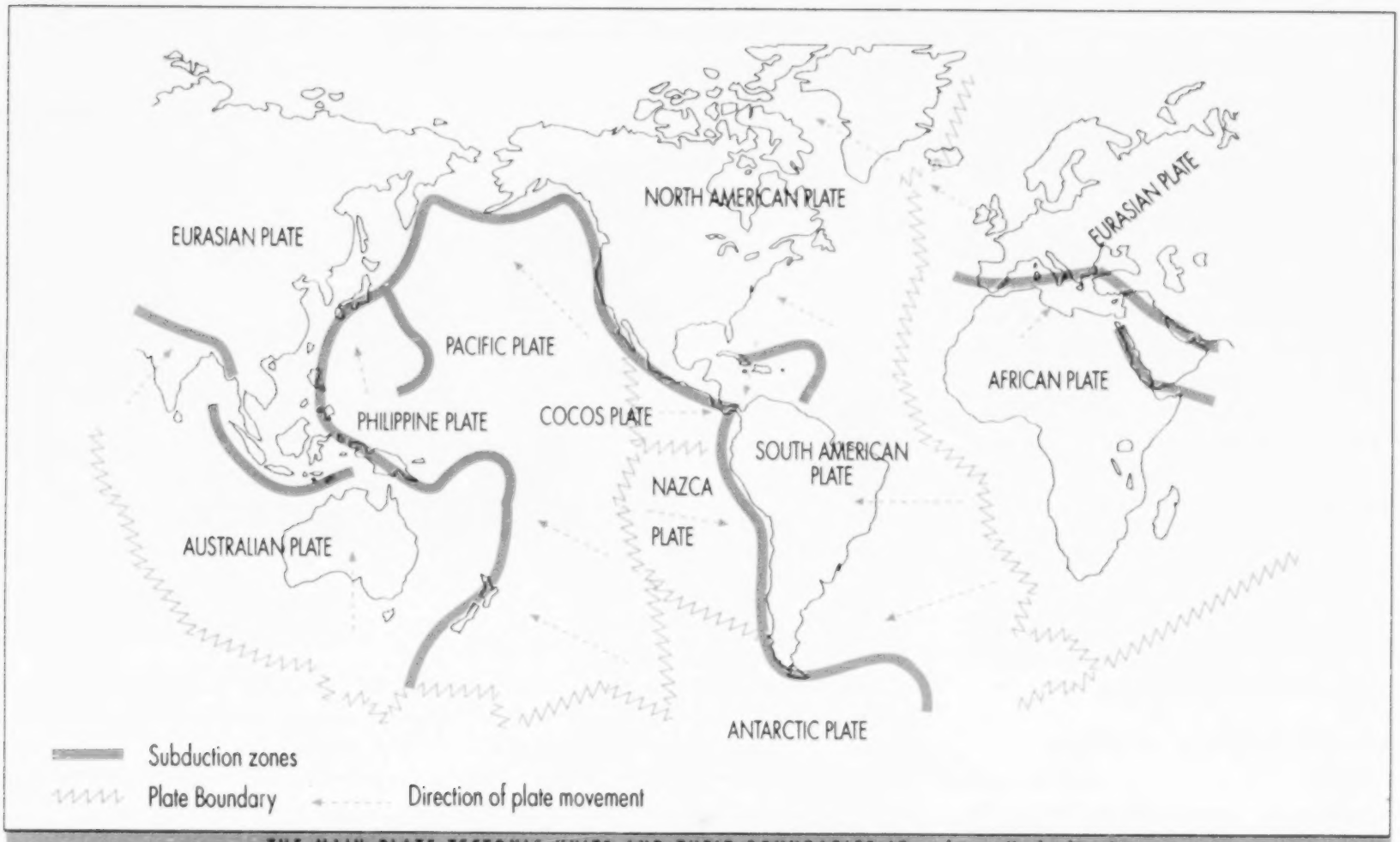
UNDER PRESSURE ...

The 20th century discovery of the Earth's system of tectonic plates has uncovered many of the world's

WHEN THE EARTH MOVES ...



THE MAIN PLATE TECTONIC UNITS AND THEIR BOUNDARIES (Graphics: Underline).

Although geology is a natural science based on observation, measurements and laboratory investigations, it can not do without general theories providing a satisfactory explanation of all available evidence.

The great theory of the twentieth century is the revolutionary concept of global or plate tectonics, elaborated in the early seventies. ("Tectonics" is the branch of science dealing with the "architecture", the structure and structural development of the Earth's crust.)

According to this theory, the Earth's solid crust consists of several rigid plates of different size. These are composed of silicate rocks (granite etc.) which are "floating" on the silicate melt (of higher density) of the underlying upper mantle, like ice plates on water.

The plates are in slow but continuous horizontal displacement called the continental drift.

The two American plates are drifting westwards, away from the Eurasian and African ones.

As a result, a gigantic fissure ("rift") has developed in the middle of the Atlantic Ocean floor, along which basaltic magma is pouring out, in successive and superimposed flows.

These basaltic lava flows are building up the so-called "Mid-Atlantic Ridge", a long submarine mountain chain.

The only place where the Mid-Atlantic Rift appears above the present-day sea level is Iceland - a unique natural exhibition site of the volcanic and post-volcanic phenomena such as geysers and sulfurous exhalations connected with ongoing rifting.

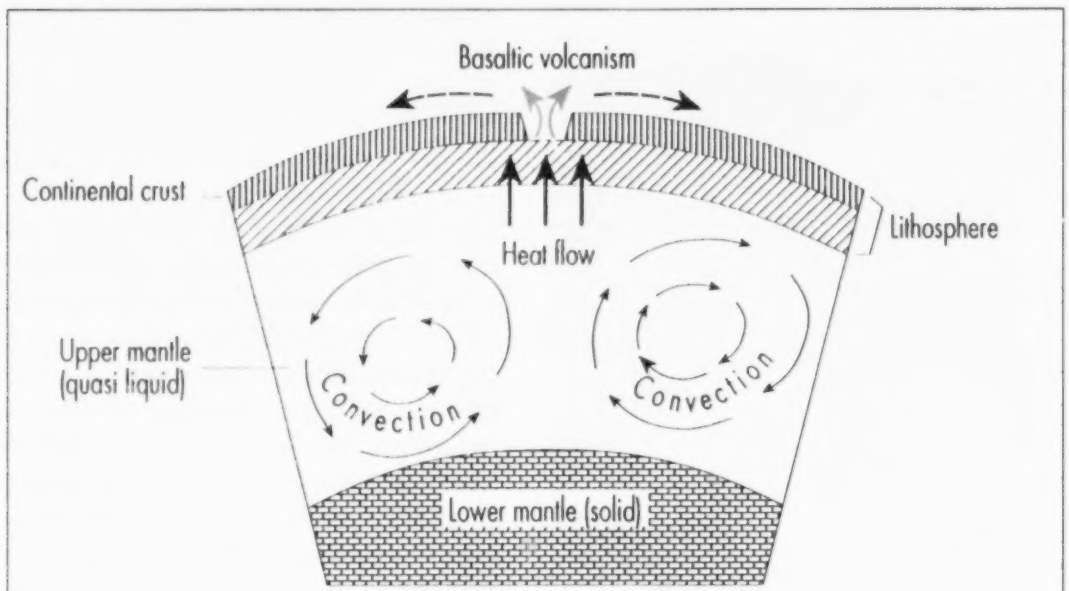
When two plates are moving towards each other, they sooner or later enter into collision, and one of them dives below the other. This process is called subduction.

Subduction accounts for intensive continental uplift and mountain building (e.g. the Himalayas, the Rocky Mountains, and the Andes), a great number of earthquakes, as well as andesitic-rhyolitic volcanism, (e.g. in Japan and in the Philippines).

The formation of many metallic ore deposits (gold, silver, copper, lead and zinc) is also linked with the many different volcanic processes.

geological mysteries, from the construction of mountain ranges to the terrible destruction of earthquakes.

A FRAGMENTED CAULDRON



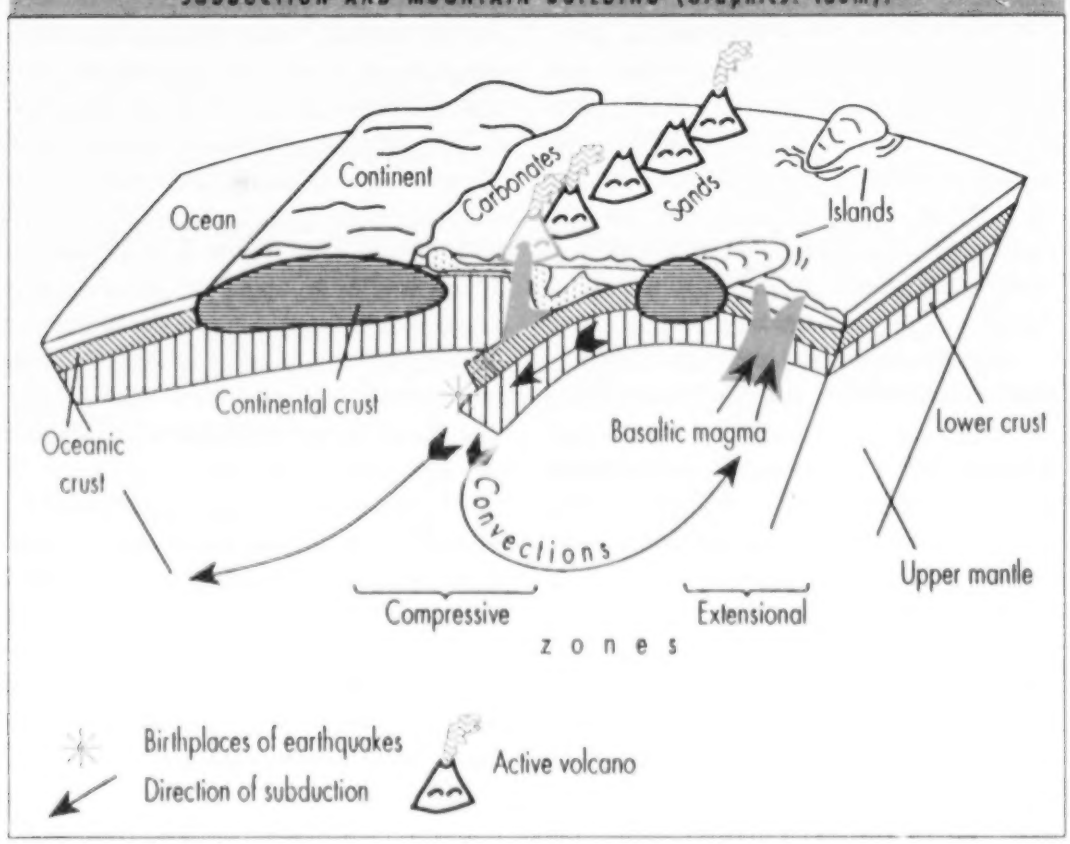
CONTINENTAL DRIFT AND RIFTING (Graphics: Idem).

As inferred from geophysical evidence, the Earth is built up of concentric "shells" or geospheres: the core (consisting most likely of heavy metals), the mantle (solid silicates in its lower part and silicate melt in the upper one), and the crust (being of different composition on the continents and on the ocean bottom.) Due probably to radioactive decay of elements, intense heat is generated in the upper mantle, producing convection flows. These seem to be responsible for the pulling apart of the crust. In the resulting fissures ("rifts") basaltic magma is coming up along the line of spreading of the ocean floor.

Those basalts provide us with a direct insight into the composition of the material of the upper mantle, different from that of the continental crust.

A CRUSHING ENCOUNTER

SUBDUCTION AND MOUNTAIN BUILDING (Graphics: idem).



Collision of two plates results in the subduction of one of them. Release of accumulated mechanical tension along the plane of subduction generates earthquakes.

The rocks of the diving plate with temperature increasing downwards, undergo partial melting. The resulting silicate magma moves upwards, producing volcanic eruptions and building volcanoes, along the margin of the continent.

In the compression zone, rocks are folded and upthrusted, building high mountains. These in turn are eroded by water, wind and ice. The resulting sediments are deposited in the depressions developed on both sides of the mountain chain.

The downgoing plate carries a mighty sequence of sediments. These enter into the composition of the resulting melt. Consequently, the ascending magma is considerably different in chemical composition from the basalts of mantle origin: it is more acid (andesitic or even rhyolitic).

THE EARTH SCIENCE'S MISSING LINK

"How can you measure change if you don't have an accurate picture of present conditions?"

Copper, cobalt and selenium are criticial to the health of cattle and sheep, and too much cadmium is dangerous for humans. If we knew where and in what concentrations these elements existed we could raise healthy farm livestock and avoid the terrible consequences of cadmium poisoning." Such is the reasoning of Arthur G. Darnley of Canada's Geological Survey, and project leader of "IGCP 259" - the somewhat nondescript tag given to a vastly ambitious project to draw up a geochemical atlas of the world.

What's a geochemical atlas? A map of the world showing the distribution and migration of chemical elements. For example, indicating where and in what quantities trace elements such as uranium are found by measuring and monitoring the earth's radioactivity. Residual fallout from past weapons testing and nuclear accidents can be measured at the same time. *"The ground surface is naturally radioactive, and has been for all time but we tend to forget that detail"* reminds Darnley. The data are gathered systematically by scientists using samples from soil, sediment from streams and lakes, and water, which must then be analysed using internationally standardized procedures.

Timing must also be taken into account according to the Canadian geologist. *"In areas that are covered by snow during the winter months, for example, the spring run-off tends to contain higher concentrations of trace metals such as copper than during other seasons."*

ECONOMIC POTENTIAL

Some of the analytical work, he suggests could be carried out in regional centres which could double up as training facilities. *"We need more people for these investigations,"* Darnley says *"and developing countries need skilled professionals."*

The uses for such a map are many and varied. *"Its economic implications are enormous"* says Darnley. *"This is particularly true for developing countries which could use the information as a guide for agricultural improvement and mineral development. In developed countries, such a map could be used to detect natural hazards in the environment and adapt land use planning accordingly. The public generally associates pollution problems and chemical hazards to industry, forgetting that there are significant variations in the natural environment to begin with."*

TAKING SAMPLES OF SEDIMENT FROM STREAMS FOR GEOCHEMICAL ANALYSIS (Photo British Geological Survey).

Darnley cites the example of a zinc mining operation in the United States that was closed down by environmental agencies because zinc concentration in the local water was too high. *"However"* he points out *"zinc levels in the area's water were higher than the Environmental Protection Agency guidelines to begin with, but the Agency was apparently not aware of this fact."* Closing down the mine alone could not have changed water quality.

Geochemical maps are also important for environmental scientists and those working on global change. *"How can you know and measure change if you don't have an accurate picture of the present condition of the environment - including its geochemistry?"* asks Darnley.

Project 259 was launched in 1988 by UNESCO's International Geological Correlation Programme and the International Union of Geological Sciences (IUGS) with the aim of assessing, demonstrating and recommending methods suitable for global geochemical mapping. Since then, the IGCP has contributed about $25,000, which has served as seed money to attract other supporters. But despite the interest the project has stirred and its potentially enormous benefits, funds have been hard to find.

$300M NEEDED

"So far we have some 80 participating countries and international agencies. Various countries 'lend' us their scientists - allowing them to commit some of their time to work for the project - but we will need some serious funding to prepare a truly global map showing distribution of all 92 elements." Darnley estimates the cost of a preliminary grid over the Earth's surface *"at about $300m, or the price of two Boeing 747s"*. But times are hard and purse strings tight. *"Geological organizations have had their budgets successively cut over the past 10 years and no-one wants to start something new. The private sector is not really tuned in to the significance of the project - it's a sector that has been interested in more obvious short-term issues. The mining companies are an exception, but they in turn are more interested in detailed investigations of specific areas."*

Despite the constraints, several countries have made significant progress. *"China, for example,"* Darnley says *"has really set an example over the past 10 years and has made more progress in the geochemical mapping of its territory than any other country. They're doing good quality work and plenty of it."* The United Kingdom has also carried out extensive work in this area. Although Russia was the first country to begin geochemical mapping in the 1930s, Russian scientists, because of the serious environmental problems in their country, would like to start over again using new and more precise technologies.

"These countries have understood the importance of such a project and the benefits it can reap," Darnley says *"but there remain a lot of others who must be educated as to the worth of this information...*

"As things stand now, geochemical maps are a major missing link between the earth and environmental sciences."

Sue WILLIAMS

OUR "GEOLOGICAL DUSTBINS"

Characterized by caves, sinkholes, underground rivers and barren rocky ground, karstland provides a unique view of the Earth's past, and perhaps its future ...

In the summer of 1991, 71 scientists from Germany, Hungary, Iran, Japan, Thailand, Britain, the U.S. and China made a 6,700 km trek across China through subtropical virgin forest, the eastern Tibetan Plateau and the Qinling Mountains. The international participants hailed it as *"the longest and most ambitious karst trip ever made"*.

The expedition was part of IGCP Project Number 299: "Geology, Climate, Hydrology and Karst Formation", and was led by Professor Yuan Daoxian, a scientist from the Institute of Karst Geology, Chinese Academy of Geological Sciences.

"Because karstland is related to rainfall and profoundly affected by climate and climatic changes, as well as by changes in human land use," said Prof. Yuan, *"the results of our investigations will not only improve our knowledge on karst formation, but will also constitute a new approach to global environmental changes, and a contribution to the rational use and management of karst-related resources and karst environment protection worldwide."*

Karst, a term originally applied to a limestone area along Yugoslavia's Dalmatian coast, is characterized by barren rocky ground, caves, sinkholes, underground rivers and the absence of surface streams and lakes. Covering 15% of the earth's surface it is found in such farflung places as the Causses of France, the Middle East, China, the Yucatan Peninsula, and parts of the U.S.

COAL, WATER AND TOURISTS

According to Yuan, an important part of tropical and subtropical cash crops and about 60% of oil and natural gas come from karst regions which are also rich in mineral deposits such as bauxite, lead, zinc, copper, tin and gold.

In China, for example, most of the coal, the country's major energy source, is karst-related. Furthermore, most of China's hydroelectric power is produced in the southwest which boasts the world's most extensive karstland. About a quarter of China's groundwater is from karst aquifer, and not least, fantastic caves and other karst features are among China's main tourist attractions.

However, because karst water and other resources are stored or flow in complex formations of different sizes and forms, they are often difficult to locate, exploit or harness, especially since these areas are frequently subject to drought, flood, deforestation and subsidence.

During the first stage (1990-91), of the 5-year project, technical guidelines were established, followed in July 1991 with a field seminar and expedition - from Guilin in south China, through Guiyang and Qinling Karst in central China to Shandong in the north.

"China is one of the most favourable regions in the world for international correlation on karst," said one participant, commenting on the wide variety of terrain, most of it quite different from other karst regions.

Three major karst types were identified: humid subtropical in south China combining tower karst, deep sinkholes, red soil, surface tufa, big caves and underground streams, many with gigantic speleothem (stalagtites, stalagmites and other formations); semi-arid karst in the north composed of mountains, dry valleys, limestone scree with loess cover, small caves, and big springs but little speleothem; high mountain karst in western China characterized by frost denudation, limestone pinnacles, tiny caves with very few speleothem and small springs.

The expedition found that in south China, karst areas are often drought-stricken although most of the territory has an annual rainfall of over 1,000 mm. *"because of leakage of surface water into underground conduits,"* Yuan explained.

During rainstorms, however, sinkholes and larger depressions called *poljens* are often flooded when underground conduits are not big enough to carry off excess water. Scientists saw the situation as worsening due to widespread deforestation although they were impressed by small-scale projects to regulate and exploit water resources in the region's karst conduits.

World geoscientists studying the earth's past have long considered caves and closed depressions as geological dustbins - where both inorganic and biological sediments remain over long geological periods without washing away. The study of karst, therefore, is shedding new light on paleoenvironments, while tracing the history of environmental change.

Currently, 227 scientists in 35 countries are involved in Project 299, with 44 areas in 18 countries proposed as representative karst sites.

By the end of the project in 1994, scientists hope to have established relationships between karstification processes and geological, climatical and hydrological conditions and relevant mineral resources. They are also developing a database to help predict future karst processes and assist in the protection of this fragile environment.

LI XIGUANG
Beijing

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A CO-OPERATIVE EFFORT

Whether it be for the preparation of a tectonic map or localizing earthquake zones, UNESCO plays a key role in bringing earth scientists together

Oddly, and probably because they appear to be inanimate, the earth's surface and its substrata are largely ignored when it comes to the planet's life processes. Yet, the Earth's crust is obviously an essential element of the biosphere, and what happens immediately underneath it has a direct impact on the surface, albeit over a period of perhaps several thousands of years. To this must be added another factor connecting the environment to geology: the earth's crust conceals a "memory" of the planet's evolution over the past four and a half billion years, and consequently, offers scientists a virtual archive of how the Earth reacted to different situations such as climatic changes.

These factors are the "raison d'être" for the Geology Programme for Environmentally Sound Development, which is separate from, but parallel to, the IGCP. *"Our attention is essentially focussed on the relationship between the lithosphere, the hydrosphere and the atmosphere"* says programme head, Robert Missotten. *"It's impossible, for example, to study erosion and its effects in a particular area if its geology is unknown."* More generally, the programme attempts to work out the "normal" state of a given environment in order to follow its evolution.

But it cannot succeed if *"our laboratory is the world"* insists Missotten. Global problems require global research. Hence, the programme's vocation to *"persuade and convince"* the best equipped scientists and laboratories in the north to work with their colleagues in the south - helping with training and equipment to create a truly global scientific network. Its first goal is to establish modern, accessible and homogeneous data bases specifically capable of dealing with information provided by satellites.

GEOLOGICAL MAPS

These latter also serve more and more often for the preparation of scientific maps, another of the major activities of UNESCO's Division of Earth Sciences. The maps published are geological (sub-soil structures), metallogenic (mineral deposits), metamorphic (zones altered by heat and pressure) and tectonic (showing distortions in the crust), not to mention the soil map of the world and the quaternary map (present era). All are small scale (one centimetre covering 50km or 250 km) *"to give an idea of a continent in its entirety - a general picture that then allows for more detailed study"* says programme specialist Lydwine d'Andigné de Asis. Prepared with the help of the Commission for the Geological Map of the World, which is a member of the International Council of Scientific Unions (ICSU), these maps are the result of a cooperative effort that could only be coordinated by an international organization like UNESCO, according to Ms. d'Andigné. This, for a very simple reason: international borders may have no geological reality, but they remain nonetheless very real barriers between geologists in terms of methodology and terminology, not to mention the information possibly withheld in the name of national sensitivities. Consequently available information is often false or incoherent.

Finally, the third aspect of UNESCO's work in the field of the earth sciences is the natural hazards programme (see Focus in the January 1990 issue of Sources). The stakes is this area are particularly high. It has been estimated that during the last 20 years earthquakes, volcanic eruptions, mudslides, tidal waves and the like, have claimed three million victims and run up two billion dollars damages. The UNESCO programme thus has two main thrusts: localizing those zones prone to natural hazards and limiting the effects of such disasters through coordinated international research and training of specialists.

R.L.

TO FIND OUT MORE ...

THE LIVING PLANET - Putting our Knowledge of Plate Tectonics to Work: Vol. 37, No. 1 in the Impact series on science and society. UNESCO/Taylor and Francis, 1987.

GEOLOGICAL CORRELATION: a special issue of the regular IGCP publication that lists the programmes scientific achievements from 1983-1987.

EARTHQUAKE PREDICTION: proceedings of the International Symposium on Earthquake Prediction: Co-published with Terra Scientific Publishing Co. which has exclusive sales rights in Japan. 1984, 995pp.

SOURCE BOOK FOR VOLCANIC HAZARDS ZONATION: by D.R. Crandell et al. (Natural Hazards series, 4), 1984). Explanatory memoir of the metallogenic map of Europe and neighbouring countries: UNESCO, 1984, 660pp.

REVIEW OF RESEARCH ON MODERN PROBLEMS IN GEOCHEMISTRY: by the International Association for Geochemistry and Cosmochemistry. Illustrated, 290pp. UNESCO, 1979.

GEOLOGICAL WORLD MAP (wall map): Scale 1:25,000,000. The only geological wall map in existence that presents the geological structure of the continents and oceans on a small scale (app.2x1m). An invaluable aid to the teaching of geology in secondary schools. Co-published with the Commission for the Geological Map of the World.

GEOLOGICAL WORLD ATLAS: Completed in 1984, comprises 22 sheets with explanatory notes. Scale: 1:10,000,000. Ocean sheets 1:36,000,000.

INTERNATIONAL QUATERNARY MAPS: have been completed for North-West Africa and and 14 European cities. Scale: 1:2,500,000.

INTERNATIONAL TECTONIC MAPS: have been completed with explanatory brochures for Africa (scale 1:5,000,000) and Europe and adjacent areas (scale 1:2,500,000).

CATALOGUE OF IGCP PUBLICATIONS, vols. I-III.: available free of charge from the IGCP Secretariat, UNESCO, Paris.

Geological map

of the world

The geological structure of the continents and oceans on a single map (1/25 000 000)

Available from UNESCO Press,
7 place de Fontenoy, 75700 Paris
(170 FF)

●

The Consultative Committee for the Integral Study of the Silk Roads: Roads or Dialogue approved **FOUR NEW EXPEDITIONS** for the project at its last meeting in New Delhi from April 20-25.

The itineraries chosen include Nalanda (India) to Dunhuang (China) via the Buddhist route in 1993, Merv (Turkmenistan) to Istanbul (Turkey) via the western desert route in 1994, Istanbul to Lyon (France) along the European Route in 1995, and Morocco to New Delhi (India) via the Ibn Batutah route in 1996.

The Committee also approved the organization of exhibitions on the Central Asian Antiquities, Arts and Crafts in the Western Himalayan Region as a parallel to central Asian Arts and Crafts and Conservation techniques applied to the Dunhuang Caves, Ajanta and Ellora, compared to other sites.

▼

"Floof" by Finnish composer and conductor Esa Pekka Salonen for soprano and ensemble, and "Icebreaking" by Danish composer Jesper Koch, 25, were the selections chosen for the "general" and "under 30" categories at this year's ***INTERNATIONAL ROSTRUM OF COMPOSERS,*** held at UNESCO from May 11-15.

Organized by the International Music Council with UNESCO and involved broadcasting organizations, the 39th Rostrum included representatives of 32 national networks from four continents.

The purpose of the Rostrum is to foster the exchange of performances of contemporary music between broadcasting organizations: for example, works chosen at last year's event were given more than 500 performances by participating radios.

UNESCO SOURCES

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1492: AFRICA'S NEMESIS

The encounter between Europe and America has cost the African continent dearly ...

"Christopher Columbus's discovery of America in 1492 marked the beginning of a global vision of the world. His arrival there has since led to many negative and positive developments, but the heirs of this historical event must do everything possible to help stimulate a dialogue between cultures and peoples—in a spirit of solidarity, not conflict." This viewpoint, expressed by an artist from Cape Verde, echoes the feeling shared by many African, European, and American specialists who gathered May 4 to 8 in Praia (Cape Verde) for a seminar organized as part of the celebrations commemorating the fifth centenary of the Encounter between Two Worlds.

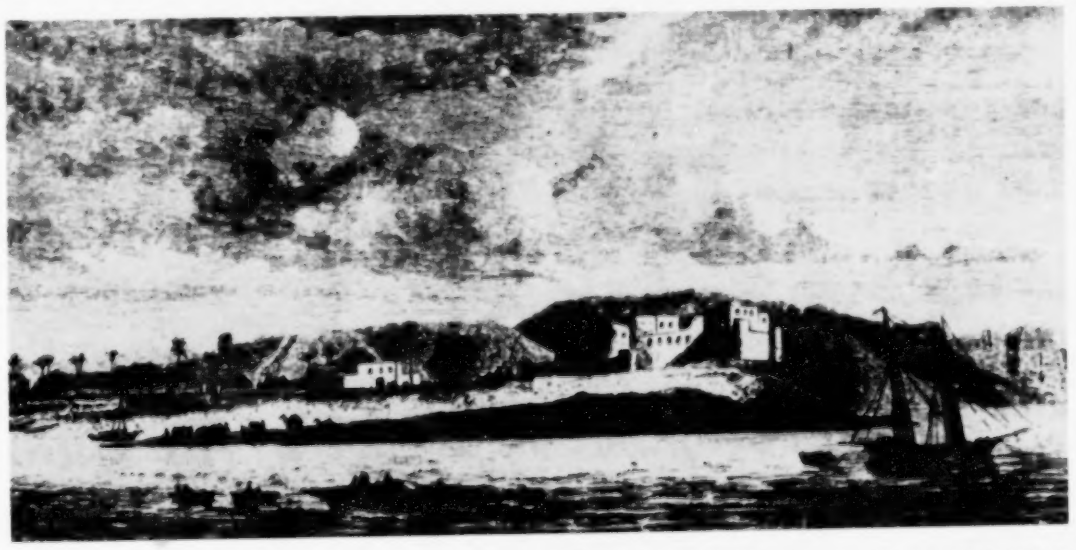
About twenty papers were presented around the meeting's central theme, "Africa's Role and its Consequences." Among them were the African situation before 1492, the immediate and subsequent aftermath of European expansion, the slave trade, African-American relations, and Pan-Africanism. The obvious desire to reach a consensus on cooperation did not mean the debates were lacking in either passion or challenging opinions on ideas that participants agreed needed for the more detailed research.

Several participants theorized that Africans reached America before Columbus basing their argument largely on the discovery of objects of possible African origin in the Americas, whose age indicates an early African presence there. Further proof is claimed in the fact that several species of domesticated plants found in Latin America, like the gourd or the cotton plant, could have originated from Africa.

Zairian Professor Elikia M'Bokolo asserts for his part that there are troubling clues, which researchers have started cataloguing. Citing anthropological studies, he advances the idea that Columbus and his companions met black men in America who could have been the descendants of sailors sent by Mali's emperor, Abubakar II, at the beginning of the 14th century.

"TREMENDOUS PROGRESS"

Experts who attended the Cape Verde conference argued that Africa was thriving in 1492 and that the discovery of the New World caused a violent upheaval on the continent which prevented its peaceful evolution. This theory was put forth in a paper by Professor Iba Der Thiam, who missed the conference but whose lecture was nonetheless delivered by a colleague. *"Before the discovery of America,"* says Thiam, *"Africa had achieved tremendous progress in all fields. It could easily have withstood comparison with any European or Asian state of the time. Africa had created institutions, built nations, organized economies, developed trade and transportation, invented scripts, imagined currencies, perfected commercial principles, stated laws, and organized social codes. Who knows what fruit such seeds*



THE ISLAND OF GOREE - DEPARTURE POINT FOR MILLIONS OF AFRICAN SLAVES SENT TO THE NEW WORLD OVER SEVERAL CENTURIES (19TH CENTURY PRINT).

would have yielded? Who can say exactly how different the continent's destiny would have been? One fact remains: Africa was then well on its way, even if all was not perfect."

M'Bokolo adds that recent data confirm the level of development reached in Africa at the time: mastery of iron and copper metallurgy, practice of stock breeding, development of tuber and cereal agriculture and growth of textile crafts. The meeting of the two worlds, however, had one disastrous consequence for Africa: the slave trade.

This is one point on which all those who attended the conference agree. The uprooting of millions from Africa, who were sent to the other side of the Atlantic, was a major handicap in the continuing development of the continent, the effects of which are still felt today.

According to Egyptian economist Samir Amin, 1492 saw the start of the European military, economic, political, ideological, cultural *"and to a certain extent ethnic"*, conquest of the planet. *"The world 500 years later remains fundamentally the same -founded on capitalist exploitation and the inequality of nations,"* he adds.Some participants even felt it legitimate to ask for compensation.

"This meeting of two worlds helped depopulate and ruin Africa and favored the enrichment of Europe," says Haitian Charles-Poisset Romain. *"The commemoration of the fifth centenary must conclude with questions, reflection, and rethinking; this is a time for restitution, reparation, and dispensing of justice, with a better humanity in mind, a world of communion and peace."*

NUMEROUS EXCHANGES

During the discussions, the accent was put on the numerous exchanges between Africa and America in different fields. Kitlé Sélassié from Ethiopia recalled that Africa gave America products such as sugar cane, bananas, coconuts, and coffee, but also livestock like sheep and goats. In return, America gave Africa peanuts, corn, potatoes, manioc, sweet potatoes, tomatoes, cocoa, and tobacco.

M'Bokolo notes that *"the introduction of American plants probably led to a kind of agricultural revolution, which we know came early to Atlantic Africa (seventeenth century in Angola), but whose modalities are still not well understood. The same holds true for American diseases, particularly syphilis, and European ones whose transatlantic spread was one of the immediate and portentous effects of the great discoveries."*

The wealth of cultural exchanges between Africa and America was vigorously stressed. *"African influence in the Americas,"* says M'Bokolo, *"primarily involved thought, beliefs, music, rituals, and symbols."* Cultural, political, and ideological influences from America to Africa were also emphasized. *"The return of emancipated slaves to Mother Africa was a crucial social factor,"* notes M'Bokolo. *"These repatriates, often organized in tightly knit networks, brought back with them all the African, European, and Amerindian ingredients of American civilizations. Now, at the beginning of the third millennium, it is not impossible to think that these exchanges will develop into rich dialogues between cultures and in solidarity among the societies of these continents."*

THE BIRTH OF PAN AFRICANISM

M'Bokolo further explained how Pan-Africanism which succeeded Negroism, started in the Americas as early as the second half of the 18th century.

Pan-Africanism was at first conceived by its precursors—considered "intellectual agitators" with theological backgrounds—as an instrument to fight slavery and the slave trade. But it evolved little by little into a doctrine advocating solidarity among blacks, whose proponents were Kwame Nkrumah, Dubois, Padmore, and Cheikh Anta Diop, author of a thesis on *"the precedence of African civilizations."* According to them, Africa was the cradle of humanity, the *"mother of science and art, later borrowed by Greece, Rome, and the rest of the Western world."*

Africa's late start, according to M'Bokolo, is principally the result of the violence it suffered at the hands of Europeans, *"starting with the discovery and exploitation of the New World. But if the triangular trades (Africa-Europe-America) robbed Africa of its most important asset,"* says M'Bokolo, *"they also brought it Pan-Africanism, one of the fertile political movements in its history."*

Diomansi BOMBOTE,
Praia (Cape Verde)

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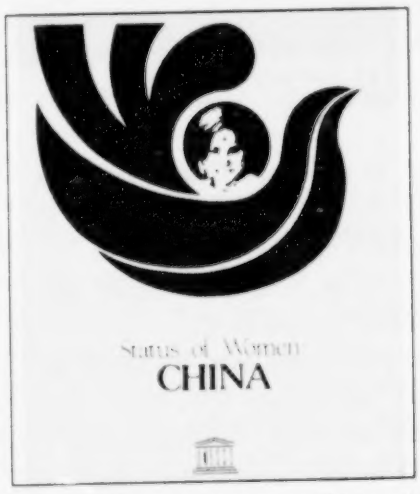
Seven monographs on the **STATUS OF WOMEN** in Asian countries namely Afghanistan, China, Laos, the Maldives, Mogolia, Thailand and Vietnam, have just been published by UNESCO's Regional Office in Bangkok to help fill gaps in the nonetheless sizeable literature built up as a result of the UN Decade for Women (1975-85) - and often accompanied by measures to enhance the status of women, better the quality of their lives and ensure their participation in development programmes. About 80 pages



each including illustrations, tables and bibliography, they were written by noted social scientists who consolidated existing studies and statistical data to produce reports on the present day situation of women in their respective countries.

☛ *UNESCO Principal Regional Office for Asia and the Pacific, P.O. Box 967, Prakanong Post Office, Bangkok 10110, Thailand.*

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ACADEMIC FREEDOM AND UNIVERSITY AUTONOMY were debated at an international conference held in Sinaia (Romania) from May 5-7. Some 200 university rectors and higher education managers and planners attended the meeting which was organized by UNESCO's European Centre for Higher Education (CEPES). In their final declaration, the participants estimated that universities themselves are largely responsible for academic freedom within their own communities. In the same vein, they found that governments and the public at large must respect the right of universities to serve as social observers and critics.

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"THE PLANET OF VICTIMS" was the theme of an exhibition presented at Headquarters from May 5 to 19 by Dutch photographer Yucki Goeldlin and her husband, Michel, a Swiss writer.

THERE ARE NO ANONYMOUS VICTIM IN WAR (Photo Yucki Goeldlin).

Through 88 photos and 30 texts, the couple brought innocent war victims worldwide out of anonymity and gauged the price of conflict - in the suffering of children, the handicapped and old people.
The exhibition, and a book, "La Planète des Victimes" (Les éditions Griot/Paris, L'Aire/Lausanne and France Loisirs) were sponsored by the International Committee of the Red Cross.

▼

In what way did the ***ENCOUNTER OF TWO WORLDS*** (1492) contribute to transforming my culture or that of my people? Writers from all over the world are invited to explore the question in a contest launched on May 8 as part of UNESCO's Commemoration of the 500th Anniversary of the Encounter between Two Worlds.
Authors may choose any literary form they wish, limiting their work to 15 double-spaced pages or less.
Entries should be submitted to UNESCO National Commissions by October 1 this year.
The winner will take home $10,000 with six runners-up each receiving a week's visit to St. Malo in France, the port from which many explorers left for the New World.

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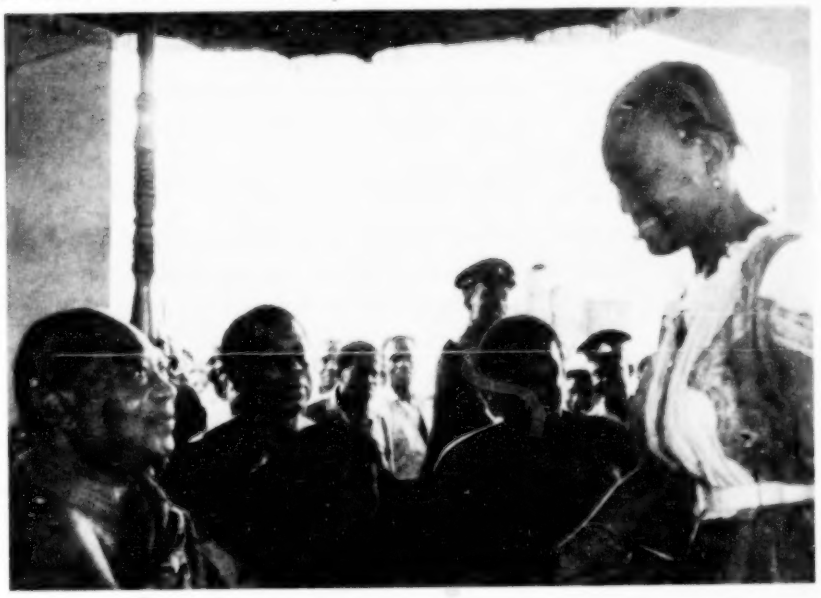
RETURN TO MAHE

A UNESCO sponsored film revives an historical link between Ghana and the Seychelles

For refusing to obey government orders, a leader is arrested, together with his family and closest allies, and shipped off to the other side of the world for more than two decades. Fiction? No. The true story of Nana Prempeh I, the king of the Asante people in Ghana who was exiled by the British colonial government to the Seychelles Islands in 1896.

With sponsorship from UNESCO, Ghana's National Film and Television Institute (NAFTI) and Radio Television Seychelles have now retold the king's story in a poignant, 54-minute video entitled "Return to Mahe".

The exile of King Prempeh is familiar to students of Ghana history. In his book



CHRISTINE BONNE, GREAT GREAT GRAND-DAUGHTER OF THE EXILED KING PREMPEH, MEETS THE PRESENT ASANTEHENE IN GHANA. (Photo UNESCO).

"Ghana: evolution and changes in the 19th and 20th centuries" Professor Adu Boahen explains that: *"In February 1894 (the British) offered to give the Asantehene (King Prempeh) and his chiefs liberal stipends should they agree to accept a British Resident at Kumasi. When this and subsequent appeals...failed, the British decided to use force...*

"On the very flimsy excuse that the Asantehene had failed to pay the indemnity imposed on Asante as far back as 1874, the British arrested Prempeh, his mother and most of the leading divisional and wing chiefs of Asante and exiled them to Sierra Leone...

"Afraid that the presence of Prempeh in nearby Sierra Leone would encourage resistance in Asante, the British transported (Prempeh and his 56 followers) as far away as Seychelles in the Indian Ocean" where he stayed until 1924 when he was allowed to return to his native soil."

"Such a story could not be allowed to get lost in the pages of history books," says NAFTI Director Bill Marshall, who conceived the film, wrote the script and co-directed it with Yaw Berko and Ralph Lablanche De Charmoy, Producer/Director of RTS.

The stars of the documentary are two descendents of Nana Prempeh I - his grandson, Francis Prempeh, 56, born in the Seychelles, but who now lives in Ghana, and the 14 year-old Christine Bonne, granddaughter of Francis' sister. The film is about Francis' visit to Mahe, the biggest of the Seychelles Islands. The journey is part of a pilgrimage to his mother's grave... and his grandfather's bungalow, which is now a national monument. When he returns to Ghana, Christine goes with him on a different kind of pilgrimage - coming home to know her roots. The response the young visitor from the Seychelles arouses in the present Asantehene, Otumfuo Apoju Ware at the Manhyia palace in Kumasi, is certainly one of the film's highlights.

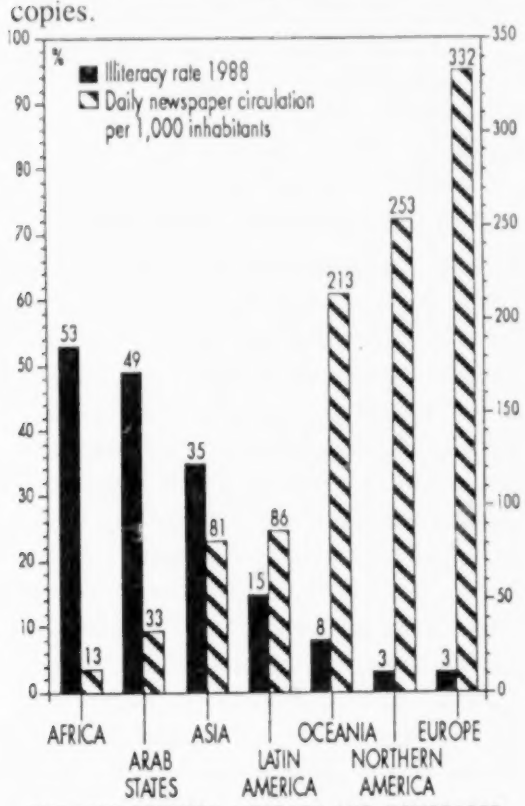
Thus the two Prempehs are the vehicles by which NAFTI Director Bill Marshall tells the story of the Ghana-Seychelles connection - a link that has been forgotten by many, but which the film clearly shows, is still very much alive for the peoples of both countries. ■

☛ *Communication Division*

MORE INFORMATION ... LIMITED ACCESS

The newspaper industry strides ahead in the developing world, but still has problems reaching readers

Every day, around the world some 530 million copies of about 9,100 daily general interest papers hit the newstands... up from 330 million copies of 7,300 dailies published in 1965. Likewise, over the past two decades, non-daily general interest newspapers increased from 28,000 to 36,000 with a corresponding rise in circulation from 190 million copies to 340 million copies.



THE LINK BETWEEN LITERACY AND NEWSPAPER READERSHIP IS MORE THAN OBVIOUS (Graphics: A. Darmon).

The publishers of the world's first newspaper in 1609 probably never dreamed of such growth in their industry. Indeed, it took almost 200 years after that before newspapers were established in all the major capitals of Europe and North America. The real mass-circulation dailies, did not come into existence before the beginning of this century.

What is perhaps equally surprising is that the figures, compiled by UNESCO's Division of Statistics, show that most of the increase in the past 20 years has taken place in the developing world, where the newspaper circulation has grown five times faster than in the industrialized countries. And in turn, most of the growth there has occurred in non-Arab Asia which published 37 percent of of all daily newspapers in 1988, representing an increase of 1,900 newspaper titles since 1965. India, for example, was the world's top newspaper publisher in 1988 with 2,200 daily newspapers, 560 more than the United States in second place. India also tops the list of non-dailies, with 8,000 publications.

ONE NEWSPAPER FOR 80 PEOPLE

However, the growth in the Developing World has not meant easier access to information for the populations of these countries. In 1988 in Africa, for example, there was one copy of a newspaper for every 80 people, as against one for every three in Europe.

"The disparities...between and within regions...can be attributed to a number of variables such as socio-economic factors or varying literacy levels," explains Kathrin Merkle, from the Section of Statistics on Culture and Communication. *"Different reading traditions, such as multiple readership which is a well known phenomenon in developing countries, should also be taken into account."*

Nevertheless, 36 countries could be considered at the so-called *"information poverty level"*, which means that there are less than 10 copies of daily newspapers per 1000 inhabitants. Twenty six of these countries are in Africa.

According to the UNESCO statistics, Western Sahara (in the Arab States region), the French territory of St. Pierre and Miquelon (Northern America), East Timor (non-Arab Asia) and Nauru (Oceania) were the only four countries or territories in the world with no newspaper at all. Twenty nine countries, mainly smaller islands, had no daily press.

The top countries for access to newspapers in 1988 were the former German Democratic Republic with 593 copies of daily newspapers per 1000 inhabitants and, for non-dailies, Switzerland, with 1,115 copies per 1000 inhabitants. The North-South gap is further emphasized by newsprint consumption: in 1988 each inhabitant of Northern America "consumed" 53 kilograms of newsprint, while those of non-Arab Africa and the Arab States made do with one kilogram each! ■

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KAZAKHSTAN AND THE REPUBLIC OF SLOVENIA have become UNESCO's 164th and 165th Member States. Formalities were concluded on May 22 and May 27th with the signing of the Organization's Constitution and deposition of instruments of acceptance. One of the first major UNESCO events to take place in Kazakhstan will be the "Seminar on Promoting an Independent and Pluralistic Asian Press" to be held in Alma Ata, the capital of the Central Asian Republic, in October. This seminar will bring together about 80 publishers, chief editors, radio and television producers and media specialists from about 18 Asian countries.

▼

Started in a tent in the 1950s, the ***EDUCATION PROGRAMME OF UNRWA*** (United nations Relief Work Agency for Palestinian Refugees in the Middle East) today boasts 634 primary schools, more than 10,000 teachers and some 375,000 students. In tandem with UNESCO, it has also established eight professional training and education centres and allocates more than 450 scholarships annually. A photographic exhibition tracing

(Photo UNRWA/M. Nasr).

this 42 year-long cooperative effort was mounted at UNESCO Headquarters from May 12-27, backed up by detailed information on the joint programmes as well as videos on the lives of Palestinians refugees and their efforts to protect their cultural identity.

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Music also provides a link between between worlds, as was clearly made evident at a concert at Headquarters on May 5 by the Mexican group **MARIMBA NANDAYAPA**. A programme ranging from Mozart to de Falla and traditional Latin American music, highlighted the marimba, a Latin American percussion instrument which, it was long believed, originated in either Africa or Asia. But designs on Mayan ceramics indicate it

MARIMBA NANDAYAPA

may be related to a Mayan instrument known as the "yolotl"(see above illustration). The event was part of the commemoration of the 500th Anniversary of the Encounter Between Two Worlds (1492-1992).

▼

The ***RUSSIAN FEDERATION OF UNESCO CLUBS*** is born. About 100 representatives of clubs from all over Russia met in Ekaterinaburg over the 21 and 22 of April for the event and elected Russian Member of Parliament, Mr. Abdoulatipov, as Federation President.

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UNESCO'S CIVIL SERVANTS, both past and present, along with friends of the Organization, have created an association to raise funds for development projects. Preference will be given to those projects linked to UNESCO's Co-Action Programme.

☛ *Fonds d'aide international, 33 Bld de Grenelle, 75015, Paris, France.*

UNESCO SOURCES

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FROM THE ASHES OF WAR

UNESCO mounts an $8million operation to restore Dubrovnik

"UNESCO could not abandon Dubrovnik," says Mrs. Gisèle Hyvert, the expert overseeing the Organization's endeavors to heal the wounds that war inflicted on this "city-monument." In the Old Town, some 1,500 shells—among which were incendiary bombs—have damaged to varying degrees more than half of the buildings. Roofs, facades, and sculptures have been hit hard. Seven palaces, among them the Festival Palace, and two houses dating back to the seventeenth and eighteenth centuries were ravaged by fire.

A detailed inventory of the damages began as soon as the fire was out. Two local organizations, the Dubrovnik Institute for the Preservation of Historical Monuments and the Dubrovnik Restoration Institute, founded after the 1979 earthquake, have thus detailed the destruction of old Ragusa building by building and taken the first steps toward restoring the city.

The inventory had to be drawn up before any comprehensive renovation project could be considered. Such a project would need to be extremely detailed and based on preliminary analysis (historical, architectural, archaeological, structural, etc.) of the damaged buildings and their environment.

These prerequisites, decided upon at a meeting of experts held in Dubrovnik from April 12 to 16, now guide the renovation project. *"The Old Town of Dubrovnik, inside the ramparts, forms an exceptionally unified urban complex, the integrity and authenticity of which must be preserved,"* say the experts. *"The renovation work must therefore spare the layout of the historic urban area, the frame structures, and the original materials."* In other words, all that still survives will be left untouched, all that was destroyed will be rebuilt exactly as was, but superficial damage will not be repaired.

REVIVING ANCIENT TECHNIQUES

Thus it was in the south of France that was found the company that will deliver the 200,000 tiles most similar to those destroyed, and needed to repair the 7,000 to 8,000 square meters of ruined roofing. Experts also discovered near Korkula Island one of the quarries from which came the stones used in the buildings and pavements of the renowned Stradun, a street/square built on a filled-in area that was once an arm of the sea dividing the heights on which the city was erected. Long abandoned, the quarry could be reopened to allow craftsmen to cut the required stones. Today's stone cutters, however, will need additional training if they are to match the skill of their predecessors.

To cope with the first emergencies, UNESCO's Director-General released $200,000 at the end of 1991. But according to current estimates the complete project will require about $8 million, a sum beyond the means of the local authorities. On top of its usual role of expertise and coordination, UNESCO is therefore also giving priority to finding funds, public and private.

The success of this operation, in terms of financing and methodology, could serve as an example for the rest of Croatia. For the destruction that befell Dubrovnik is but a drop in the sea of ruins engulfing the region: estimates reveal that throughout the rest of Croatia, some 250 monuments and sites have been damaged in the conflict, and another 100 have been razed.

René LEFORT

CENTRAL ASIA IN SIX VOLUMES

Introducing one of the world's least known regions

In many ways the period between the 16th and 18th centuries marked a turning point in the history of Central Asia. Wars, invasions, conquests, the flow of people, goods and ideas there had always been; but it was during this period that the *"encroachment of the West began to be noticeable,"* says eminent Indian historian Prof. Nurul Hasan. *"There was Russian movement eastwards towards Siberia and Kazakhstan and forays into Turkic inhabited areas."* Our relations with our own neighbours, he adds in substance, had to pass through the European sieve, and the *"memory of the days when we related directly to Samarkand and Bukhara was already fading."*

Prof. Hasan is the editor of Volume V - covering the 16th, 17th and 18th centuries of the six-volume History of the Civilizations of Central Asia currently being prepared under UNESCO's auspices. The first two volumes are due to be released shortly and Volume III will be out next year.

The project was launched in 1980 with the idea of stimulating interest and understanding of the roots that bind the peoples of this region and of the forces that have shaped their histories. An International Scientific Committee was set up comprising fourteen members from Central Asia and five from other regions, and it quickly got down to the task of structuring the six volumes.

A CROSSROADS OF CIVILIZATION

"This region has been a crossroads of civilization, on account of both its geographical location and the multiplicity of cultures it has engendered", says Mr. N. Kasi of UNESCO's Cultural Histories and Studies Section.

The volumes which begin at the dawn of history and come right up to modern times will cover Afghanistan, Northern Iran, Pakistan, Northern India, Western China, Mongolia and the former Central Asian Republics of the Soviet Union. These boundaries, however, cannot be rigidly defined, for "Central Asia" is a cultural and historical notion rather than a geographically defined entity.

Social, political and cultural life will be included in this broadbased work as will philosophy, religion, nomadic cultures, life styles, science, the arts, oral traditions, languages, urban development and the movement of peoples.

"It is a comprehensive view of a kind that has not been attempted before," says Dr. T.R. Sareen, Director of the Indian Council of Historical Research which hosted a meeting (April 13-16) of the Scientific Committee's Bureau in New Delhi to prepare the final drafts of Volumes IV and V and the blurprint of Volume VI.

Aimed at the highest possible scientific level, the History of Civilizations of Central Asia is written, as Prof. Hasan says, with *"the informed lay reader in mind."*

It does not hesitate to show divergences of views where these exist. *"Each writer,"* explains Prof. A.H. Dani, Director of the Centre for the Study of Civilizations in Islamabad and member of the Bureau, *"retains his point of view even if this differs from another writer. It is up to the general editor of each volume to point out these divergences."*

Latika PADGAONKAR
New Delhi

PARIS TO BALI BY BICYCLE via 10 countries and 30 sites on UNESCO's World Heritage List...such is the mission undertaken by Frenchman Mathieu Pouly, 25, to promote one of UNESCO's most important messages: the Earth's greatest cultural and natural treasures are of such universal worth that it is the duty of all to protect them.

MATHIEU POULY, A MAN WITH A MISSION (Photo UNESCO/Inez Forbes).

Pouly set out from UNESCO Headquarters on April 29 on his 15,000 km journey that coincides with the 20th anniversary of the World Heritage Convention. *"If certain artistic, esthetic or architectural manifestations of different civilizations have succeeded in resisting invasions, wars, the ravages of climate ... it is because they are part of a universal language which concerns everyone,"* said the young cyclist, who is sponsored by the World Federation of UNESCO Clubs, Centres and Associations.

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LOOKING AHEAD

A seminar on "Social Change, Demographic Trends, Family Structures and Gender Relations in Muslim Societies" will be held in London from July 6 to 9. Special attention will be given to the **WOMEN OF CENTRAL ASIA** at the meeting which is being organized by UNESCO with the School of Oriental and African Studies.

"THE NEW EUROPE CONFERENCE", organized by the European Foundation Centre, the Fondation de France and UNESCO's International Fund for the Promotion of Culture, will take place at UNESCO Headquarters from July 8 to 10. The Conference aims to promote visibility and European self-awareness of the non-profit sector and encourage new partnerships between institutions, governments, corporations and associations. The second meeting of the Scientific Committee charged with the organization of the International Congress on the **CONSERVATION OF STONE** and Other Materials (June 29 to July 1, 1993) will be held at Headquarters on July 15 and 16 to finalize invitation lists and the selection of papers to be presented.

A series of events will take place at Headquarters between July 8 and October 8 as part of the 20th birthday celebrations for the **WORLD HERITAGE CONVENTION**: July 8 will see the inauguration of a major **EXHIBITION** of photos and reproductions of certain World heritage sites, including the columns of a Greek temple and a house typical of those found in old Istanbul. Over the following three months exhibitions, concerts, dance, films and conferences will be organized by China, Equador, Greece, Spain, France, Romania, Tunisia and Jordan. The fourth scientific expedition organized under the Integral Study of the Silk Roads: Roads of Dialogue, which will retrace the **ROUTE OF NOMADS**, will set out from Khovdø (Mongolia) in the heart of the Altaï Moutains on July 13. The scientific team comprising some 60 experts from 20 countries, journalists and television crews as well as technical staff, will cover 4,000 kms during the voyage, part of which will be undertaken on camels and horseback. The expedition will wind up in the capital of Mongolia, Ulan Bator, on August 3 to 5 with an international seminar on "The Nomads of Central Asia and Silk Roads" and an exhibition on the same subject.

OUR NEXT ISSUE will focus on the **WORLD HERITAGE CONVENTION** and how UNESCO is working to harmonize the difficult and sometimes contradictory tasks of conserving our cultural and natural treasures and promoting development.